NOAA Response to EISWG Statement on Ongoing NWS Data Dissemination Challenges

A Presentation to the NOAA Science Advisory Board

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Outline

- Purpose; Issue Statement
- EISWG Recommendations and NOAA Responses
- NOAA Coordination and Views
- Desired Outcome

Purpose

Provide NOAA's response to the Science Advisory Board's (SAB) Environmental Information Services Working Group's (EISWG) statement concerning the ongoing NWS data dissemination challenges.

Issue

The Science Advisory Board's EISWG provided **four** recommendations related to the ongoing NWS data dissemination challenges

NWS has reviewed the recommendations and provided responses to each recommendation.

Recommendations from EISWG

1. Design and implement an emergency response
2. Strengthen engagement with the broader Weather Enterprise
3. Prioritize designing and moving to an appropriate scalable architecture:
   a. leverage content delivery networks
   b. accelerate the migration to commercial cloud networks
4. Enhance user management, product availability announcements, and training programs

EISWG Recommendation 1: NWS Response

"Design and implement an emergency response"

- NWS conducted an in-depth analysis about what applications caused the greatest bandwidth constraints, worked directly with our partners, and implemented a solution that met partner needs for model data access.

- In parallel, NWS received **$1.5M** in FY21 to look toward a longer term bandwidth solution and swiftly procured network- related hardware as a first step to alleviate the restriction:
  - An **upgraded network** card to enable the clustering of firewalls in Boulder to match College Park and increase bandwidth.
  - **Upgraded routers** as the next step in updating the hardware to support a larger circuit between College Park and Boulder.
  - **Load balancers** to increase bandwidth by over 50% from 65G to 100G.

EISWG Recommendation 1 (con't)
NWS Response

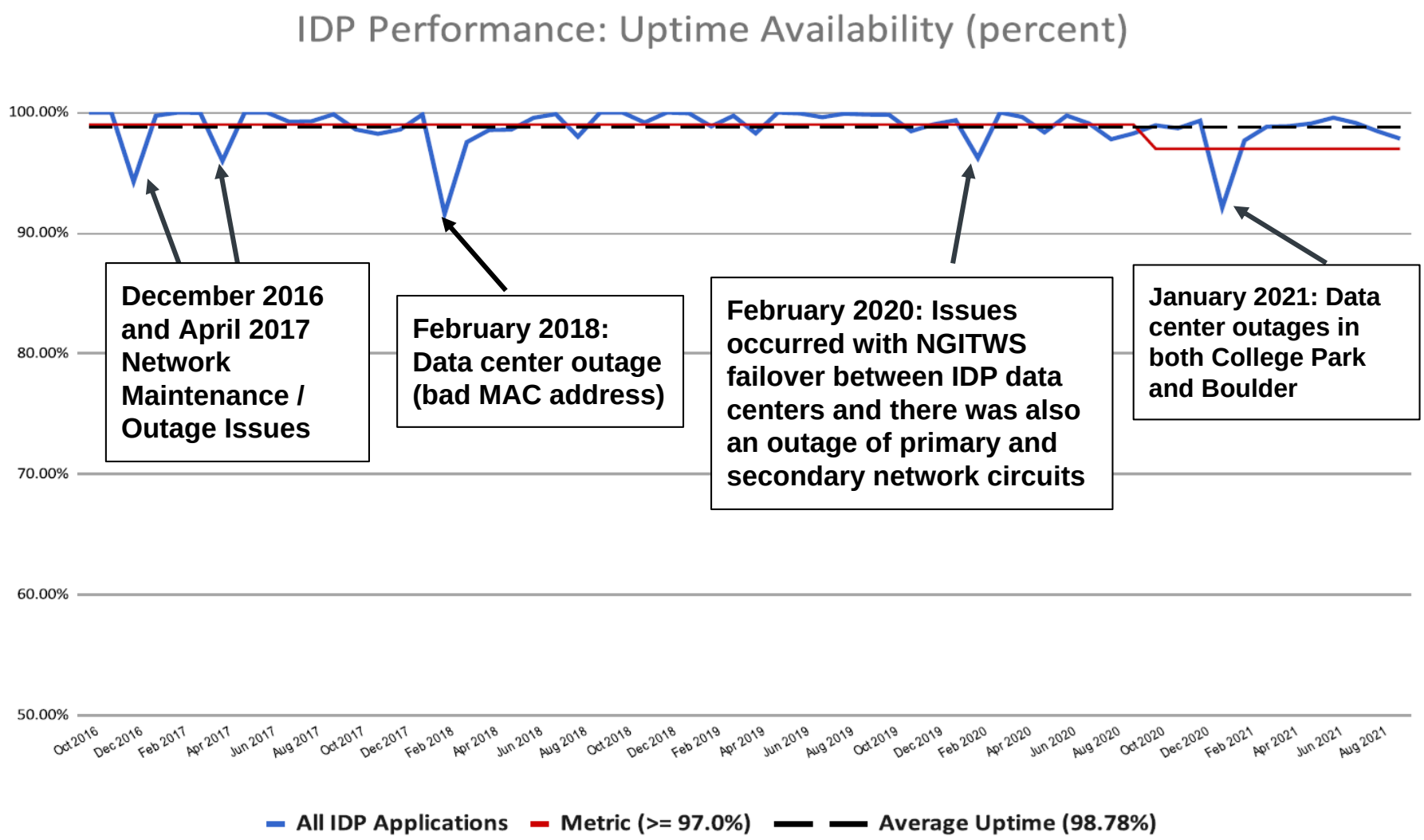
"Design and implement an emergency response"

By the end of Q3 FY22, NWS will **upgrade the network bandwidth** at both IDP Data Centers (including the circuits between the sites) to 100G.

- These upgrades will **reduce the current bandwidth constraint**s for external customers to access IDP services and data.
- NWS will **manage access limits** as a security measure to mitigate against abuse and service attacks.
- NWS will **adjust these approaches** as new methodologies and resources become available.

FY21 Q4: IDP Performance - Uptime Availability

30 September 2021



Average Uptime for all IDP applications from: FY17 - FY21 = 98.78%

FY17 - 99.0% FY18 - 98.3% FY19 - 99.6% FY20 - 98.8% FY21 - 98.1%

EISWG Recommendation 2: NWS Response

"Strengthen engagement with the broader Weather Enterprise"

- The NWS concurs that direct engagement with the Weather Enterprise has **improved our current IDP operations** and our plans for the future.

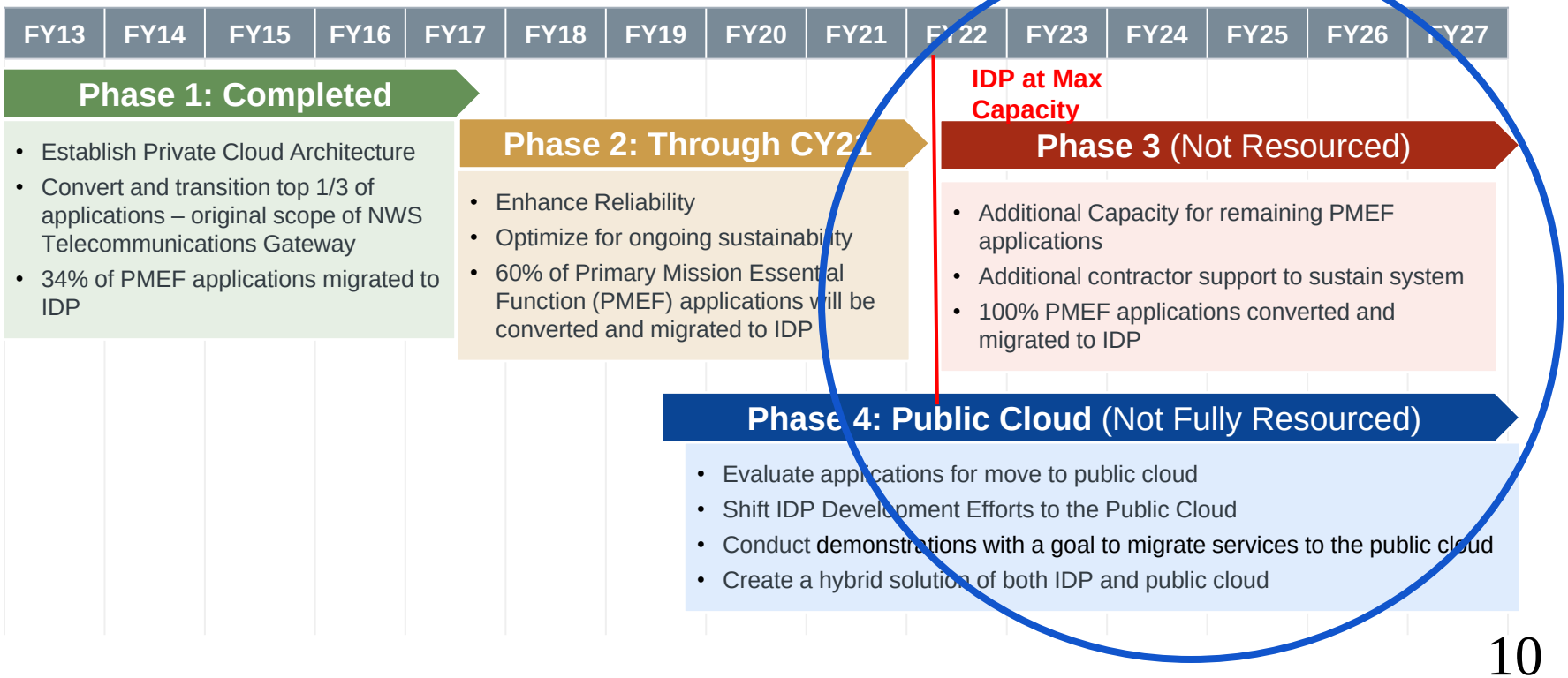
- Conversations between NWS leaders, SMEs and individual enterprise members **helped NWS discover and remove problematic processes and barriers**.

- NWS **welcomes this engagement** and is open to establishing regular forms to discuss ways to improve services for our external partners and customers.

EISWG Recommendation 3: NWS Response

"Prioritize designing and moving to an appropriate scalable architecture"

NWS IDP Plan and Timeline



EISWG Recommendation 3a NWS Response

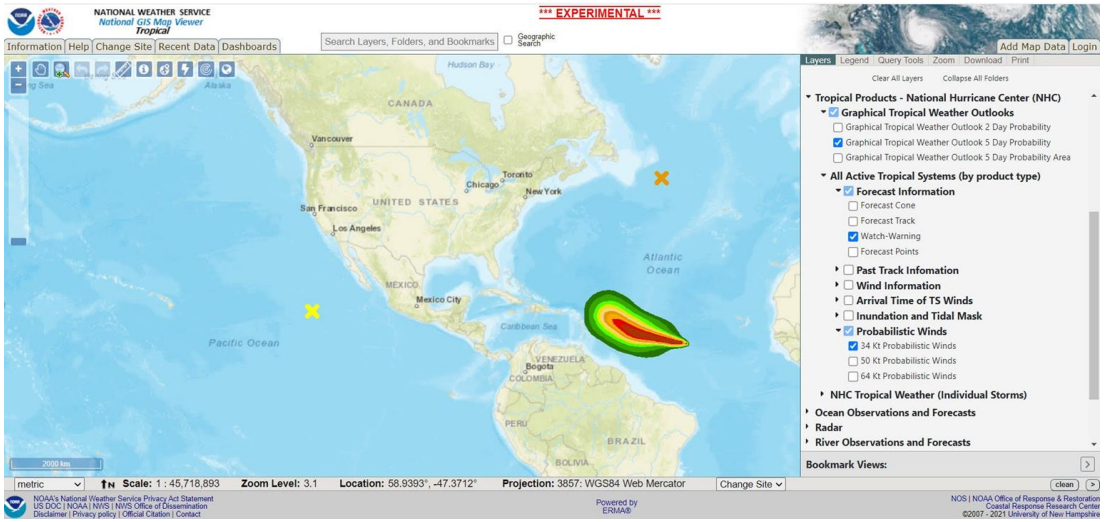
Prioritize designing and moving to an appropriate scalable architecture - leverage content delivery networks

- NWS recognizes the value of using cloud for data dissemination and has **leveraged Content Delivery Networks** (CDN) successfully.
- NWS has **hosted most weather.gov traffic on a CDN**, offloading ~80% of the total internet bandwidth from websites that NWS data centers would normally serve.
- A **CDN hosts the National Hurricane Center website** and allows for surges in traffic during tropical events.
- Depending on FY22 funding, NWS will invest **expanding the use of a CDN** provider to serve existing NOMADS and FTPPRD services to the edge, reducing impacts to IDP on-premise infrastructure.

EISWG Recommendation 3a (con't)
NWS Response

Prioritize designing and moving to an appropriate scalable architecture - leverage content delivery networks

- In FY21, NWS launched initiatives that **utilize cloud computing** and associated capabilities and will continue to expand these services in FY22:
  - The **GIS Viewer and HydroViz** platforms will leverage load balanced and geolocation-based caching and measurable & resilient content delivery through NOAA Public Cloud (AWS Cloud Utility Contract)



GIS Viewer: New layers will be added throughout FY22

EISWG Recommendation 3a (con't)
NWS Response

Prioritize designing and moving to an appropriate scalable architecture - leverage content delivery networks

- Selected NOMADS datasets are publicly available for **dissemination on NOAA's Big Data platform** (BDP).

- NWS is working closely with its user-base to ensure that **making model data available via the BDP platform** and Cloud Service Providers will not disrupt end-users' downstream processes.

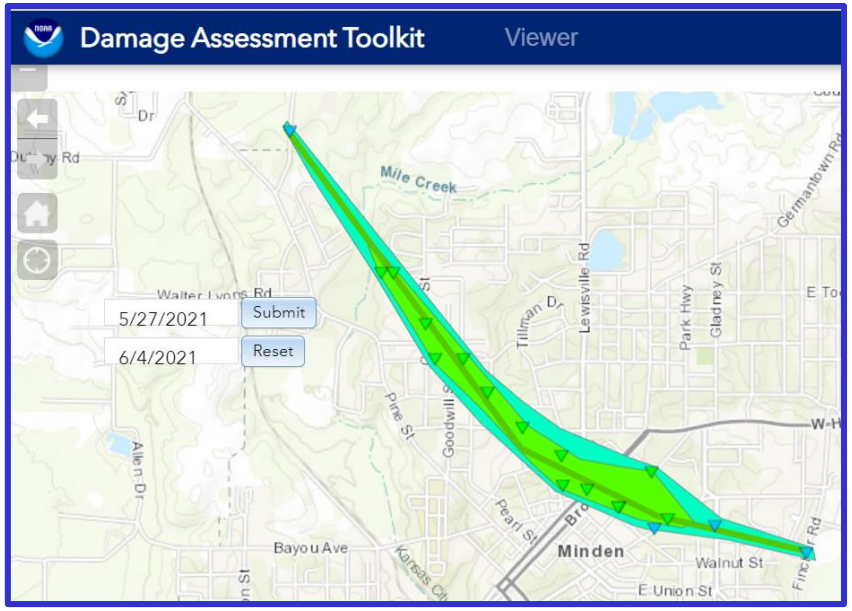
- Depending on FY22 funding, NWS will invest **expanding the use of a CDN** provider to serve existing NOMADS and FTPPRD services to the edge, reducing impacts to IDP on-premise infrastructure.

- NWS is ensuring an end-user/operations support model for any long-term solution delivering model data to the enterprise.

EISWG Recommendation 3b: NWS Response

"Prioritize designing and moving to an appropriate scalable architecture - accelerate the migration to commercial cloud networks"

- NWS follows the NOAA Cloud Strategy, which aligns with the federal Cloud Smart strategy and complies with the principles of free open and equal access to the public.
- NWS has initiatives that utilize the NOAA Cloud Utility contract and BDP contract: Examples:
  - **GIS Viewer and HydroViz projects:** establish a unified GIS platform on a commercial cloud to enable dissemination of real-time Flood Inundation Mapping
  - **The Damage Assessment Toolkit**: collects and disseminates post weather-event data is already live and operational on an AWS platform



EISWG Recommendation 3b (con't)
NWS Response

"Prioritize designing and moving to an appropriate scalable architecture - accelerate the migration to commercial cloud networks"

- NWS is **ready to accelerate its cloud migration** and has worked with Forrester since 2019 to develop cost models for cloud candidates, such as NOMADS/MAG.
- NWS will **migrate cautiously and deliberately** to ensure that security, operational integrity and performance goals are met.
- NWS recognizes the legacy nature of some applications and realizes that it must **invest substantial resources** to re-architect and modernize. Lift and shift is not an option for many of the legacy applications.
- NWS **embraces the SAB suggestions** and will ensure a proper emphasis in Phase 4 of the IDP Plan.

Phase 4: Public Cloud (Not Fully Resourced)

- **Evaluate applications for move to public cloud**
- **Shift IDP Development Efforts to the Public Cloud**
- **Conduct demonstrations with a goal to migrate services to the public cloud**
- **Create a hybrid solution of both IDP and public cloud**

EISWG Recommendation 3b (con't)
NWS Response

"Prioritize designing and moving to an appropriate scalable architecture - accelerate the migration to commercial cloud networks"

- Based on resources, NWS plans to move in parallel as we transition data access from on-prem to cloud and simultaneously refactor/re-architect/ready applications for the cloud migration.
- Based on the FY22 President's Budget, the NWS can begin moving to the public cloud in the timeframe referenced in the IDP Plan. However, if NWS moved the foundational data more rapidly, it would face a trade-off decision between increasing the speed of the move to the cloud or leaving some mission- essential applications on the end-of-life, non redundant legacy hardware (Phase 3 of the IDP).

EISWG Recommendation 4: NWS Response

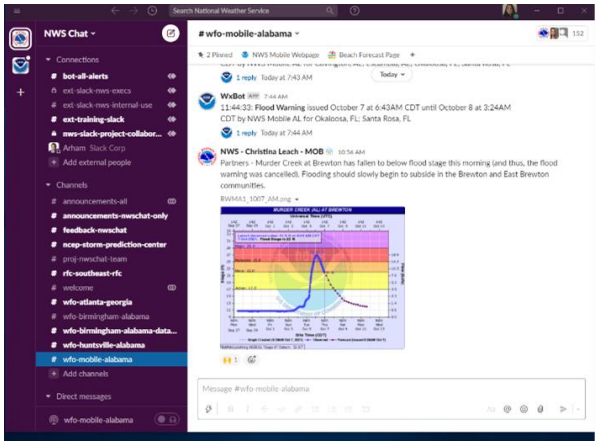
"Enhance user management, product availability announcements, and training programs"

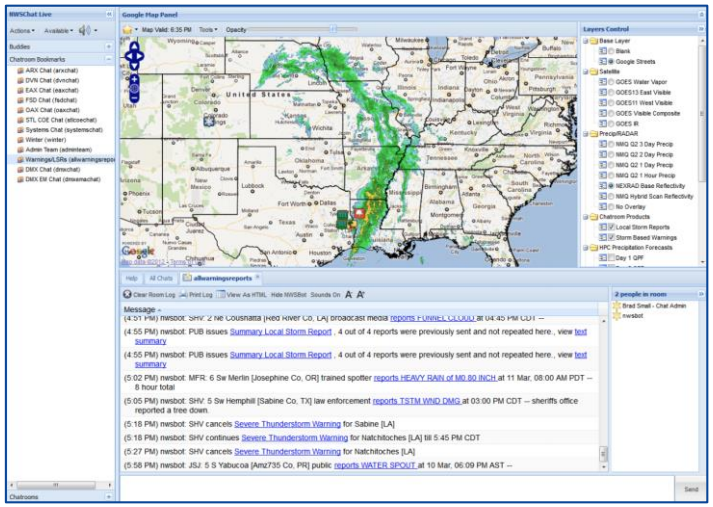
- The NWS agrees that reducing excessive demand is prudent given the current limitations of IDP
  - NWS managed demands during extreme weather events in the past year by distributing guidance on using NWSChat to ensure those who truly need to use the system can do so.
  - We help users adjust their pattern of usage after being blocked
- NWS is considering the use of a publish/subscribe system that would allow users to choose the information they would like to subscribe to for automatic updates.
- NWS intends to increase the number of webinars to provide enhanced notification to our users and partners about upcoming upgrades, tests, etc.
- NWS has awarded a 1-year contract with Forrester Research, Inc., to conduct a NWS Customer Experience Assessment. It will evaluate the capacity and maturity of CX in the NWS.

EISWG Recommendation 4 (cont.)
NWS Response

"Enhance user management, product availability announcements, and training programs"

- NOAA **employed SNS** (Simple Notification Service) with the NOMADS datasets on the BDP. We are collecting user feedback and determining if it the global community can feasibly use it.
- NWS is **demonstrating a cloud-version of its NWSChat** process that allows for user subscriptions to alerts as enabled by the underlying COTS product.





Questions?